

Crystal Ball questions on indicators

All of the following questions have not (as yet!) appeared in the NCEA Level 1 Exams

1)

| Indicator | pH | | | | | | | | | | | | |
|---------------------|----|---|---|---|---|---|---|---|---|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Thymol blue | R | * | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Bromocresol green | Y | Y | Y | * | B | B | B | B | B | B | B | B | B |
| Bromocresol purple | Y | Y | Y | Y | Y | * | V | V | V | V | V | V | V |
| Universal indicator | R | R | R | O | Y | Y | G | B | B | P | V | V | V |
| Alizarin yellow | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | * | V | V |
| Litmus | R | R | R | R | R | * | * | * | B | B | B | B | B |

R = red, O = orange, G = green, B = blue, P = purple, Y = yellow and V = violet. * = pH range (to the nearest whole number) when indicator is changing colour.

Discuss the pro's and con's of the six different indicators listed in the table above.

2) Complete the table below

| type of solution | stomach acid | pure water | oven cleaner |
|--|--------------|------------|--------------|
| scientific name | | | |
| chemical formula | | | |
| pH range or number | | | |
| colour in Universal indicator | | | |
| sketch of a beaker showing H^+ and OH^- ions of the solution | | | |

3)

| <i>Plant part</i> | <i>Colour of dye</i> | | |
|--------------------|----------------------|---------------------|-----------------------|
| | In pure water | In acid solution | In alkali solution |
| Petals | | | |
| Red hibiscus | Pink | Orange | Blue-green |
| Red oleander | Mauve | Pink | Green |
| Red rose | Pink | Pink | Olive-green |
| Red canna | Red | Orange | Dark-green |
| Red geranium | Red | Orange | Yellow |
| Red dahlia | Red | Orange-red | Amber |
| Mauve impatiens | Mauve | Pink | Green |
| Purple lasiantha | Purple | Pink | Blue |
| Purple aster | Purple | Pink | Green |
| Yellow marigold | Yellow | Yellow | Yellow |
| Yellow dandelion | Yellow | Yellow | Yellow |
| Orange nasturtium | Orange | Yellow | Yellow |
| White rose | Colourless | Colourless | Amber |
| White daisy | Colourless | Colourless | Yellow |
| Other parts | | | |
| Red cabbage leaf | Purple | Pink | Green |
| Raw beetroot | Red | Red | Yellow |
| Green spinach leaf | Green | Yellow-green | Yellow-green |

Many different plant parts can be used as indicators. Some plants and some plant parts are more useful than others, as can be seen by the different colours produced by the plants in pure water, acid and alkali. Discuss the use of plant parts as indicators.